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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/787,017	02/24/2004	Tae-Hee Kwon	SHIN1.005AUS	3961
20995 7590 06/22/2007 KNOBBE MARTENS OLSON & BEAR LLP 2040 MAIN STREET FOURTEENTH FLOOR IRVINE, CA 92614			EXAMINER GODBOLD, DOUGLAS	
			ART UNIT 2626	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/787,017	Applicant(s) KWON, TAE-HEE	
	Examiner Douglas C. Godbold	Art Unit 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20040224, 20051102</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to application 10/787,017 filed February 24, 2004. Claims 1-5 are pending in the application and have been examined.

Priority

2. The application claims priority to Korean application 2003-50552 filed July 23, 2003 and application 2003-52682 filed July 30, 2003. The priority date of July 23, 2003 has been considered in this action.

Information Disclosure Statement

3. The information disclosure statements filed February 24, 2004 and November 02, 2005 have been considered in this office action.

Specification

4. 35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms which are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are: On page 1 line 24, "on" should be "in." Page 2, line 11 reads, "In the meantime, it has been studied for improving a performance of speech recognition by..." There are numerous other grammatical errors throughout the specification.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-5 rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: In claim 1, step b recites "calculating misclassification measure using discriminant function," however nowhere is the discriminant function generated. Step e recites "modifying HMM weight according..." but nowhere is an HMM weight generated to be modified. Further, in step f, classification parameters are transformed, however, nowhere are classification parameters even generated or mentioned, beforehand. Claims 2-5 are also rejected as they are dependent on claim 1.

7. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claimed equation includes the term " w_i ." However, nowhere is this defined in this claim, nor the claim on which it depends. Further it is unclear as to what M is. The claim defines M as representing the number of HMM. However this could be the state that is currently being considered, or the total number of states.

8. Claims 1-5 are rejected under 35 U.S.C. 112, second paragraph, also as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors.

Claim Rejections - 35 USC § 101

9. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

10. Claims 1-5 are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. Claims 1 attempts to claim an HHM Modifying method. However, there is tangibility (no input or output), nor is there a useful result that comes from the claimed method. Therefore claim 1 is rejected under 35 U.S.C. 101 as well as claims 2-4 as they are dependent on claim 1.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. Claims 1, 2, 4, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chou et al (US Patent 5,579,436) in view of Kwon et al (GDP-Based State Modification by Weighted Linear Loss Function.).

14. Consider claim 1, Chou teaches an HMM modifying method (provides parameter updates, abstract), comprising the steps of:

a) performing Viterbi decoding for pattern classification (Generator 75 generates N-best string models based on the N-best word strings by a Viterbi alignment of the input speech string, X, against the model sets for each given word string in the N-best string list; column 15, line 55.);

b) calculating misclassification measure using discriminant function (String misrecognition measure processor 83 receives HMM parameters, λ , optimal state sequences, $\theta_{s,k}$, and N string models, S_k , and a training speech string sample, X, from generator 75, column 16, line 31. Also, equation 31.);

d) computing a delta coefficient according to the obtained misclassification measure (In minimum string error rate training, the goal is to minimize the expected loss (33) over the training samples. The expected loss (33) may be minimized by updated recognition unit model parameters such that [equation 34], column 17, line 28. Equation 37 shows the relation of the original probabilities with the transformed probabilities, which is based in part on the misclassification measure, as described in column 17. finally, an update expression (or delta coefficient) is derived at column 18, line 45.);

e) modifying HMM weight according to the delta coefficient (FIG. 6 presents an illustrative block diagram of the HMM update processor 89. As shown in the Figure, the HMM update processor 89 updates parameters μ , σ^2 , c, and a, based on $\lambda_{l,i}$, X and I, and returns an updated $\lambda_{u,i}$ to HMM parameter data base 72. Both $\lambda_{l,i}$ and $\lambda_{u,i}$ comprise parameters μ , σ^2 , c and a, with $\lambda_{l,i}$ and $\lambda_{u,i}$ representing unupdated and updated quantities respectively; column 18 line 49. further column 19 shows adjusting specifically the weights.); and

f) transforming classifier parameters for satisfying a limitation condition (FIG. 6 presents an illustrative block diagram of the HMM update processor 89. As shown in the Figure, the HMM update processor 89 updates parameters μ , σ^2 , c, and a, based on $\lambda_{l,i}$, X and I, and returns an updated $\lambda_{u,i}$ to HMM parameter data base 72. Both $\lambda_{l,i}$ and $\lambda_{u,i}$ comprise parameters μ , σ^2 , c and a, with $\lambda_{l,i}$ and $\lambda_{u,i}$ representing unupdated and updated quantities respectively; column 18 line 49.).

However, Chou could be construed to suggest but does not specifically teach:

c) obtaining modified misclassification measure for a weighted loss function.

In the same field of HMM modification, Kwon teaches obtaining modified misclassification measure for a weighted loss function (page 1104, equation 16 shows a modified misclassification measure, described by the paragraph that follows.).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use the modified measure as taught by Kwon with the HMM modifying method as taught by Chou in order to reinforce correct strings efficiently while still penalizing errors (Kwon, page 1104, line 25.)

15. Consider claim 2, Kwon teaches 2. The method as recited in claim i, wherein the weighted loss function $d_{\sim}(X;A)$ is defined as:

$$\begin{aligned}\tilde{d}_i(X;A) &= d_i(X;A) - k \cdot g_i(X;A) \\ &= -(1+k) \cdot g_i(X;A) + \log \left[\frac{1}{N} \sum_{j=1, j \neq i}^N \exp \{ g_j(X;A) \eta \} \right]^{\frac{3}{2}}\end{aligned}$$

wherein i and j is positive integer number and i representing a number of class, $g_i(X;A)$ is the discriminant function for class i with A being a set of classifier parameters and X is an observation sequence, N is an integer number representing class models and k is positive number representing the number of HMM state (page 1104, equation 16 shows a modified misclassification measure, described by the paragraph that follows.).

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16. Consider claim 4, Chou teaches the method as recited in claim 1, wherein in the step f), the classifier parameter is transformed by the limitation condition, which a summation of HMM weights in a HMM set is limited to a total number of HMM in the HMM set, which is defined as:

$$\sum_{i=1}^M w_i = M, \quad 0 < w_i < M,$$

wherein M is positive integer number representing the number of HMM. (The

adjusted mixture weights meet the constraints of $\sum_k c_{i,j,k}(n) = 1$ and $c_{i,j,k}(n) > 0$; column 19, line 45.) .

17. Consider claim 5, Chou teaches the method as recited in claim 1, wherein in the step a), the discriminant function is obtained by a Viterbi decoding (where $g(X, S.\text{sub.lex}, \text{LAMBDA}) = \log f(X, \text{THETA}.\text{sub.S.sbsb.k}, S.\text{sub.lex}.\text{vertline}.\text{LAMBDA})$ is a log-likelihood recognizer score of the input utterance X given S.sub.lex as the correct string; column 16, line 61. This same g() is defined in this current application and the discriminant. One of ordinary skill in the art can appreciate that this term would be obtained by Viterbi decoding.) .

Allowable Subject Matter

18. Claim 3 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph and 35 U.S.C. 101, set forth in this Office action and to

include all of the limitations of the base claim and any intervening claims. The prior art of record does not teach, nor fairly suggest the ratio claimed in claim 3.

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure is included in the notice of references cited.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas C. Godbold whose telephone number is (571) 270-1451. The examiner can normally be reached on Monday-Thursday 7:00am-4:30pm Friday 7:00am-3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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DCG


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